

ABSTRACT

Main chain thermotropic liquid crystal esters, ester-imides, and ester-amides were prepared from AA, BB, and AB type monomeric materials and were end-capped with phenylacetylene, phenylmaleimide, or nadimide reactive end-groups. The resulting reactive end-capped liquid crystal oligomers exhibit a variety of improved and preferred physical properties. The end-capped liquid crystal oligomers are thermotropic and have, preferably, molecular weights in the range of approximately 1000-15,000 grams per mole. The end-capped liquid crystal oligomers have broad liquid crystalline melting ranges and exhibit high melt stability and very low melt viscosities at accessible temperatures. The end-capped liquid crystal oligomers are stable for up to an hour in the melt phase. These properties make the end-capped liquid crystal oligomers highly processable by a variety of melt process shape forming and blending techniques including film extrusion, fiber spinning, reactive injection molding (RIM), resin transfer molding (RTM), resin film injection (RFI), powder molding, pultrusion, injection molding, blow molding, plasma spraying and thermo-forming. Once processed and shaped, the end-capped liquid crystal oligomers were heated to further polymerize and form liquid crystalline thermosets (LCT). The fully cured products are rubbers above their glass transition temperatures. The resulting thermosets display many properties that are superior to their non-end-capped high molecular weight analogs.